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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/803,295

03/18/2004

Mani Sundaram

20030127-US

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42716

7590

12/28/2005

MAINE & ASMUS

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EXAMINER

HU, SHOUXIANG

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/803,295

Applicant(s)

SUNDARAM ET AL.

Examiner

Shouxiang Hu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 8-15 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 16, 17, 19 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/16/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Claims 9-15 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on October 13, 2005.

In addition, claims 8 and 18 which each recite a blocking layer are also withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being unreadable on the elected Species I of Fig. 2.

Accordingly, claims 1-20 are pending in this application; and claims 1-7, 16-17 and 19-20 remain active in this office action.

Drawings

Figure 1 is objected to as the device structure is admitted as from the prior art and it thus should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified

and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7, 16-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (Applicant's Admitted Prior Art) in view of Carruthers (US 5,459,332) and/or Gunapala (Gunapala et al., US 6,674,091).

AAPA discloses a QWIP (Fig. 1), comprising: an emitter contact and a collector contact, with a stack therebetween, wherein the stack includes quantum wells each sandwiched between barrier layers.

AAPA does not disclose that the sharp and straight vertical barrier between the emitter contact (or the collector contact) and the stack can be replaced with a barrier having a plurality of steps, one of ordinary skill in the art would readily recognize that such gradually raised barrier can be desirably formed for reducing dark noise/currents, as evidenced in Carruthers (see col. 7, lines 23-30) and/or Gunapala (see col. 8, lines 5-22). And, it is further noted that it is art known that a graded bandgap and a step-like bandgap both function substantially equivalently.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the device of AAPA with the barriers, including each of the barriers or at least including the barrier between the emitter and the stack and/or the barrier between the stack and the collector, being step-like formed with step-like composition ratios, per the teachings of Carruthers and/or Gunapala, so that a QWIP with reduced dark noise/current would be obtained. And, with such step-like barrier structure in the collectively taught device, dark electrons would be naturally move quickly to from the emitter to the stack and to the collector, or vice versa, which would naturally reduce the dielectric relaxation effect, in a manner substantially same as the one of the instant invention.

Regarding claims 2 and 17, it is noted that the step (or gradient) of the composition ratios is an art-known result-oriented parameter of importance, subject to routine experimentation and optimization.

Regarding claims 3 and 4, it is noted that the recited indirect band structure with GaAs wells and AlGaAs barriers and the recited strained-gap type structure with InGaAs and AlGaAs barrier are both well-known structures and material sets commonly used in the art for forming a QWIP with desired performance.

Regarding claim 5, it is noted that the thicknesses of the wells and barriers are all art-known result-oriented parameters of importance, subject to routine experimentation and optimization.

Regarding claim 19, it is noted that it is art-known that multiple sets of quantum wells/barriers can be desirably stacked together for forming a stacked QWIP capable of detecting multiple wavelengths.

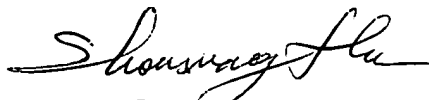
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SH
December 26, 2005


SHOUXIANG HU
PRIMARY EXAMINER